GR 6: Andere Gebiete

GR 6.1   Di 18:05   30.45: 101

On the Charge 3 Cyclic Monopoles — •Victor Enolski — Hanse-Wissenschaftskolleg, Delmenhorst — Institute of Magnetism, Kiev

We study SU(2) BPS monopoles of the charge 3 with spectral curve that respect C_3-symmetry. It is of the genus four and taken in the form $\eta^3 + a\eta\zeta^2 + \zeta^6 + b\zeta^3 - 1 = 0$ where a and b are two real parameters.

First we consider the case $a = 0$ and establish that the only curve of this family that yields BPS monopole correspond to tetrahedrally symmetric monopoles. We introduce on this stage several new techniques making use of a factorization theorem of Fay and Accola for theta functions, together with properties of the Humbert variety and higher order hypergeometric relations of Ramanujan. The geometry leads us to a formulation purely in terms of elliptic functions.

Then we are extending this result by continuity to $a \neq 0$ and find (numerically) a curve in parameter a, b-plane that produces monopole solutions. To do that a well adapted homology basis is presented enabling the theta functions and monopole data constructed by initial genus four curve to be given in genus two data. The Richelot correspondence and generalize arithmetic-geometric mean is used to solve this genus two curve.